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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/540,224	08/08/2006	William G. Tong	07252-025US1	3313

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EXAMINER	
WILDER, CYNTHIA B	

ART UNIT	PAPER NUMBER
1637	

NOTIFICATION DATE	DELIVERY MODE
01/25/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

Office Action Summary	Application No.	Applicant(s)	
	10/540,224	TONG, WILLIAM G.	
	Examiner	Art Unit	
	CYNTHIA B. WILDER	1637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 November 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-7 and 17-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-7 and 17-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 June 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Applicant's amendment filed 11/5/2009 is acknowledged and has been entered. Claim 1 has been amended. Claims 1-3, 5-7, and 17-22 are pending. Claims 4 and 8-16 have been canceled. All of the arguments have been thoroughly reviewed and considered but are not found persuasive for the reasons discussed below. Any rejection not reiterated in this action has been withdrawn as being obviated by the amendment of the claims.

This action is made FINAL.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Previous Rejections

3. The claim rejections under 35 USC 112 second paragraph is withdrawn in view of Applicant's arguments. The prior art rejections under 35 USC 103(a) as being unpatentable over Sandstrom et al in view of Weinberg et al and further in view of Tong is maintained and discussed below.

Claim Rejections - 35 USC § 103

4. Claims 1-3, 5-7 and 17-22 are finally rejected under 35 U.S.C. 103(a) as being unpatentable over Sandstrom, P (US20030174324, effective filing date August 2000) and further in view Weinberg et al (US 6248540, June 2001) and further in view of in view of Tong (5600444, February 1997).

With regards to claims 1-3, 5-7 and 17-22, Sandstrom provides a method for processing microarrays comprising a plurality oligonucleotides and methods for screening polymers on microarrays to detect biological activity (0126-0142). Sandstrom teaches wherein the microarray is combined with an optical signal detection system comprising an optical detector (0008-0021 and 0039-0053). Sandstrom teaches measuring an output of the optical detector to represent a signal (0167); and removing background noise by scanning a blank area between adjacent DNA cells (0019, 0053, 0148 and 0173) Sandstrom teaches that blank areas allows reduction of background noise (0173) and comparison of non-specific hybridization (0019). Sandstrom et al also teaches determining inhomogeniety of DNA cells at different locations on the microarray pages 13 and 14).

Sandstrom differs from the instant invention in that Sandstrom does not teach wherein the microarray is placed in an optical degenerate four-wave mixing (DFWM) systems or steps for performing the optical DFWM system for analysis.

Weinberg et al teach a method for screening compounds attached to a microarray, wherein said screening of said array further comprise detection via optical spectroscopic techniques (col. 10, lines 12-26 and col. 27, lines 38-44), wherein said optical spectroscopic techniques include the use of a degenerate four wave mixing optical technique that depends on the interaction of three photons to produce the fourth photon, i.e., the signal, and only one wavelength, wherein the signal is a coherent beam easy to detect (col. 28, lines 52-57). Wienberg et al teach that DFWM is unlike fluorescence which is emitted in all directions and is therefore easy to detect at higher

sensitivity (approximately 10,000 molecules under favorable conditions. Wienberg et al teaches that the selectively of this techniques relies on the absorption properties of the species being detected and can be though of as being analogous to absorption spectroscopy except that it is more sensitive, more selective and has a higher spatial resolution (col. 34, lines 26-57).

While Weinberg provides sufficient motivation for why one would want to use DFWM for screening a microarray versus other techniques, such as e.g., optical spectroscopy systems based on fluorescence, Weinberg et al does not teach how the DFWM system specifically operates to generate a DFWM signal.

Tongs supports the limitations of the claims 5-7 and 17-22, Tong teach a device and technique for performing highly sensitive spectroscopic measurements in a sample using a four-wave mixing laser beams in nonlinear degenerate four wave mixing optical system (abstract). Tong teaches that the Tong et al teaches alignment template having holes for transmitting beams. Tong et al teach that the templates serve as spatial filters to prevent the scattered background light from reaching the optical detector. Tong et al teach that the template may be made by simply forming four small holes, one for each beam involved in a four wave mixing process, in tow thin aluminum plates. Tong et al teach that the template is position relative to a furnace chamber so that holes define the path of the forward pump, holes define the path of the probe, holes define the path of the signal beam, and holes define the path of the backward pump. Tong et al teach that the positions of the templates are fixed relative to each other for a desired four wave mixing configuration (col. 4, lines 22-65 and Figure 2). Tong et al teach wherein

the DFWM system comprises backward scattering or forward scattering. Tong teaches that DFWM comprising backward scattering and forward scattering configuration are useful because of the phase conjugate property of the signal beam. Tong teaches that the phase conjugate property of the signal beam generated by an analyte in DFWM method has many potential applications including autocorrection of beam distortion or optical aberration (col. 13, lines 19-35).

It would have been obvious to one of ordinary skill in the art at the time of the claimed invention to use the microarray comprising a plurality of DNA cells as taught by Sandstrom in an optical DFWM system as taught by Weinberg and Tong rather than in the optical analysis systems of Sandstrom. One of ordinary skill in the art would have been motivated to use the DFWM system as taught by Weinberg and Tong based on the advantages taught by both Weinberg and Tong that DFWM is a more sensitive, more selective and has a higher spatial resolution than fluorescent-base optical analysis systems as taught by Sandstrom. The use of an optical DFWM system in combination with microarray analysis is within the ordinary artisan's technical grasp as by suggested by Weinberg.

Response to Arguments

5. Applicant traverses the rejections on the following grounds: Applicant states the combined teachings of the cited prior art fails to disclose removing a background noise in the measured DFWM signal of the one DNA cell by sing a DFWM measurement of a blank area between the one DNA cell and an adjacent DNA cell and scanning a position of the microarray to place other DNA cells of the microarray in the DFWM system to get

respective DFWM signals. Applicant states that they recognize that the cited Sandstrom describes using "sites" of an array as the "blanks" or "reference sites" and these sites are clearly the array element sites of the array. Applicant states that nothing in the cited Sandstrom discloses "removing a background noise in the measured DFWM signal of the one DNA cell by using a DFWM measurement of a blank area between the one DNA cell and an adjacent DNA cell" in claim 1. Applicant states taht the balnk area between the one DNA cell and an adjacent DNA cell in claim 1 is very different from a reference site of an array disclosed in the cited Sandstrom. Applicant states that the high spatial resolution of the DFWM in detecting microarray of DNA cells is achieved at such a level to allow for detecting a blank area between two adjacent DNA cells is a feature that is completely missing in any cited portions of the cited McFarland, Mann, Sandstrom and Weinberg. Applicant further argues that none of the cited references teach scanning the blank area through the DFWM system or scanning different locations within a DNA cell in the DFW system.

6. All of the arguments have been thoroughly reviewed and considered but are not found persuasive for the reasons that follow:

In response to Applicant arguments concerning the teachings of Sandstrom et al and the lack of a teaching of a blank array and removing background, MPEP states that, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Contrary to Applicant's arguments, Sandstrom provides sufficient evidence

of providing an array comprising a blank area and the elimination of background signal based on the blank area on an Microarray (see citation made of record in prior Office action and in Applicant's arguments at pages 7 and 8 of Remarks filed 11/5/2009). While the Examiner agrees that Sandstrom et al do not teach wherein the array is placed in a DFWM system, the secondary references provides sufficient evidence that a microarray could be combined with a DFWM system and further provides evidence as to why one would want to place a microarray in a DFWM system. The tertiary teachings of Tong provide evidence as to how the system operates along with means of scanning various areas of the array. Thus, the Examiner maintains that the combination of the cited prior art provides sufficient evidence of a prima facie case of obvious in providing a microarray and use of the microarray in a DFWM system.

7. In response to Applicant's arguments that the combination of the cited prior art does not teach various elements of the method such as scanning a blank area of the array or scanning different positions of the microarray to obtain a DFWM system, Applicant's attention is directed to *KSR Int'l Co. v. Teleflex Inc.* (550 U.S.____, 127 S. Ct. 1727 (2007)) where the Supreme Court determined that "a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. In that instance the fact that a combination was obvious to try might show that it was obvious under § 103 (*KSR*, 550 U.S. at ____, 82 USPQ2d at 1397)." The Supreme Court also determined that "[t]he combination of familiar elements according to known methods is likely to be obvious when the combination

does no more than yield predictable results (KSR, 550 U.S. at ___, 82 USPQ2d at 1395)." Thus KSR forecloses the argument that a specific teaching, suggestion, or motivation is required to support a finding of obviousness.

In this case, the combination of the microarray comprising an optical detector as taught by Sandstrom with the optical degenerate four wave mixing system of Weinberg and methods of use of the optical degenerate four wave mixing system as taught by Tong et al would have yielded predictable results concerning: (a) detecting multiple DFWM signal to determine level of hybridization and background optical noise; and (b) determining spatial inhomogeniety within a DNA cell. The steps of scanning and washing while using the system as argued by Applicant would are obvious over the combined teachings of Sanstrom in view of Weinberg and Tong and further would have been obvious to the ordinary artisan since these general and routine steps are within the ordinary artisan's technical grasp and commonly applied when using microarray analysis to determine hybridization patterns of DNA cells. Accordingly, these arguments are not found persuasive.

Applicant's arguments are not sufficient to overcome the prior art rejections noted above. Accordingly, the rejections under 35 USC 103(a) are maintained.

Conclusion

8. No claims are allowed. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CYNTHIA B. WILDER whose telephone number is (571)272-0791. The examiner can normally be reached on a flexible schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion can be reached on (571) 272-0782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/CYNTHIA B. WILDER/

/GARY BENZION/
Supervisory Patent Examiner, Art Unit 1637